USMC H-1 Program

Assault Advanced Technology Review Board

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AIR-4.5.1.2

301-995-4379

USMC Utility Helo Today

UH-1N "HUEY"

AIRFRAME: BELL HELICOPTER
ENGINES: T400-PW-400
93 AIRCRAFT INVENTORY
DELIVERIES 1971-1979
AVERAGE AGE 28 YEARS
AVERAGE 20 FLT HRS/MONTH

MISSION TASKS

- AIRBORNE COMMAND & CONTROL
- COMBAT ASSAULT SUPPORT
- CONTROL OF SUPPORTING ARMS
- SPECIAL OPERATIONS SUPPORT
- SEARCH & RESCUE AUGMENTATION
- MEDICAL EVACUATION
- SHIPBOARD & AUSTERE BASE OPS
- NIGHT & ADVERSE WEATHER OPS
- VISUAL RECONNAISSANCE

USMC Attack Helo Today

MISSION TASKS

- TRANSPORT HELO SUPPORT
- GROUND FORCE FIRE SUPPORT
- CONTROL OF SUPPORTING ARMS
- SEARCH & RESCUE AUGMENTATION
- VISUAL & ARMED RECONNAISSANCE
- SHIPBOARD & AUSTERE BASE OPS
- NIGHT & ADVERSE WEATHER OPS
- ANTI-ARMOR OPERATIONS
- ANTI- HELICOPTER OPERATIONS
- ENEMY FIXED WING DEFENSE

AH-1W "SUPER COBRA"

AIRFRAME: BELL HELICOPTER

ENGINES: T700-GE-401

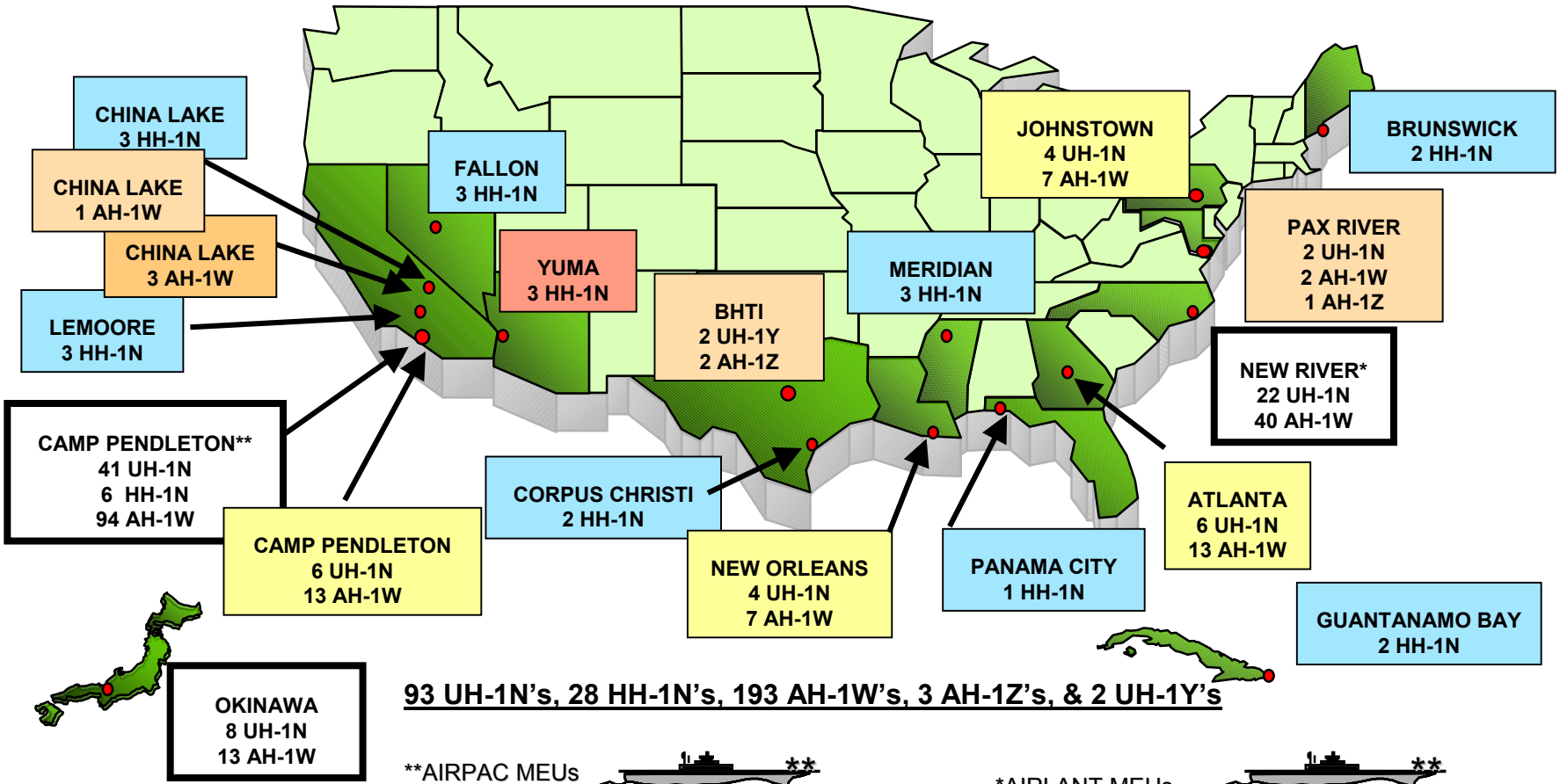
193 AIRCRAFT INVENTORY

DELIVERIES 1986-1998

AVERAGE AGE 12 YEARS

AVERAGE 20 FLT HRS/MONTH

H-1 Sites Quick Look



93 UH-1N's, 28 HH-1N's, 193 AH-1W's, 3 AH-1Z's, & 2 UH-1Y's

**AIRPAC MEUs

3 UH-1N, 6 AH-1W, 13 MEU, HMM 165

3 UH-1N, 6 AH-1W, 31 MEU, HMM 262

3 UH-1N, 4 AH-1W, 11 MEU, HMM 166, working up

3 UH-1N, 6 AH-1W, 15 MEU, HMM 163, returned

*AIRLANT MEUs

2 UH-1N, 6 AH-1W, 22 MEU, HMM 261

2 UH-1N, 6 AH-1W, 24 MEU, HMM 263, working up

2 UH-1N, 4 AH-1W, 26 MEU, HMM 365, returned

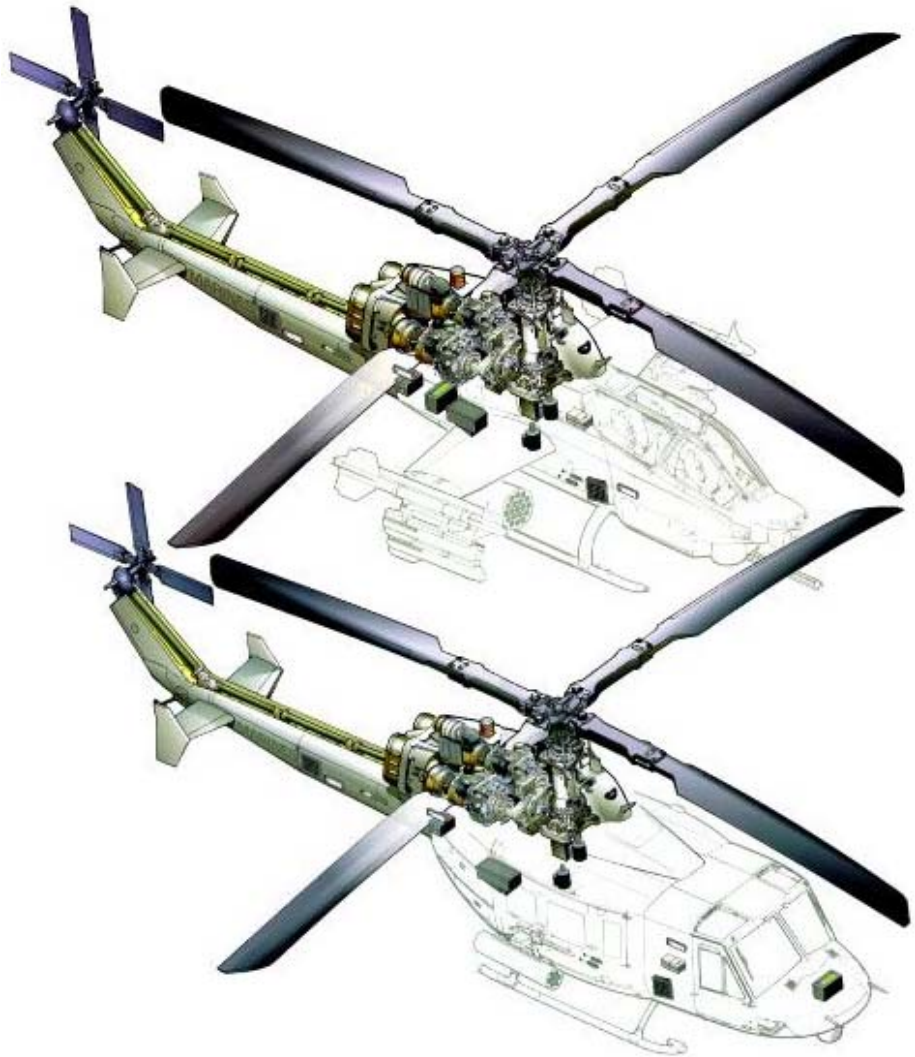
As of 3/07/02

H-1 Upgrades Program Description

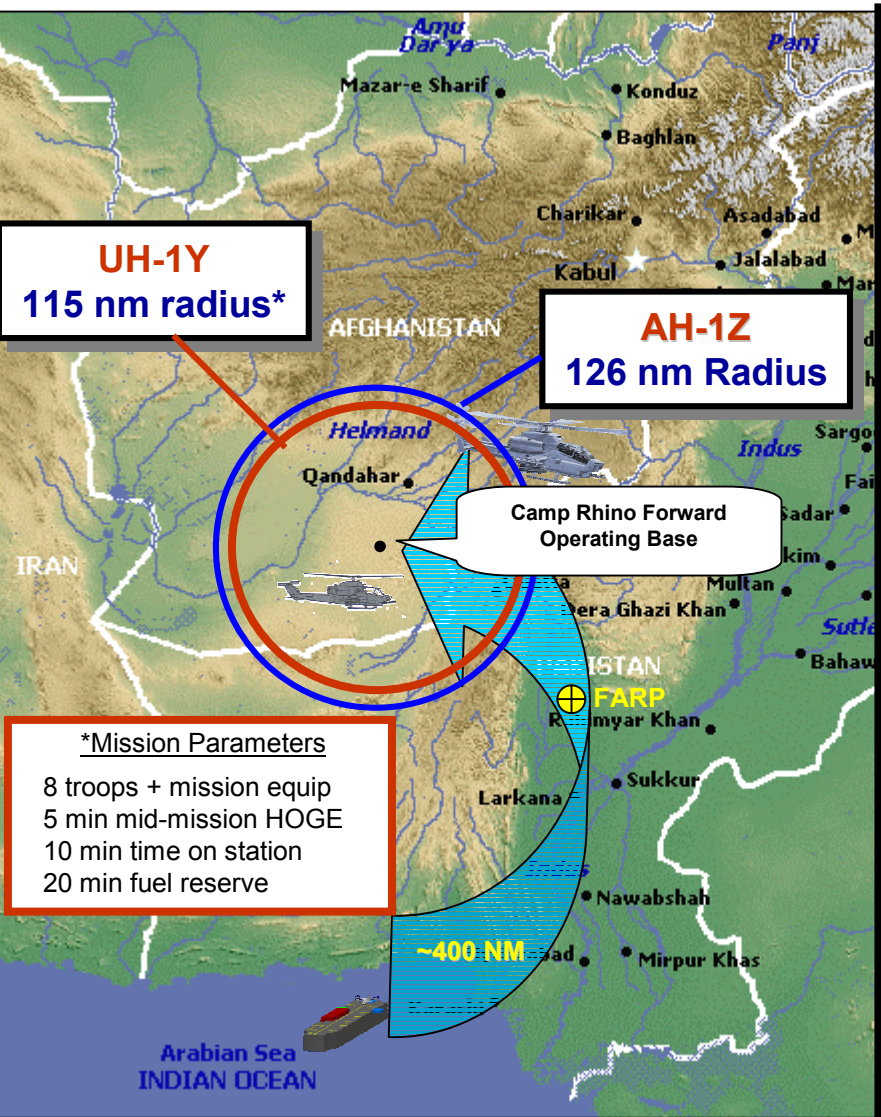
Upgrades AH-1W & UH-1N
- 100 UH-1Ys & 180 AH-1Zs
- 4-bladed rotor system
- 10,000 hour airframes
- Integrated glass cockpits

Dramatic Performance Improvements
- Increased range, payload, speed
- Increased ballistic tolerance
- Increased crash survivability

84% Identical Major Components
- Composite blades
- Crashworthy seats
- Hydraulic components
- Fuel system components
- Integrated avionics & software
- T700-GE-401/C engines
- New Gearboxes



Sea Strike: AH-1Z/UH-1Y Supporting the MAGTF



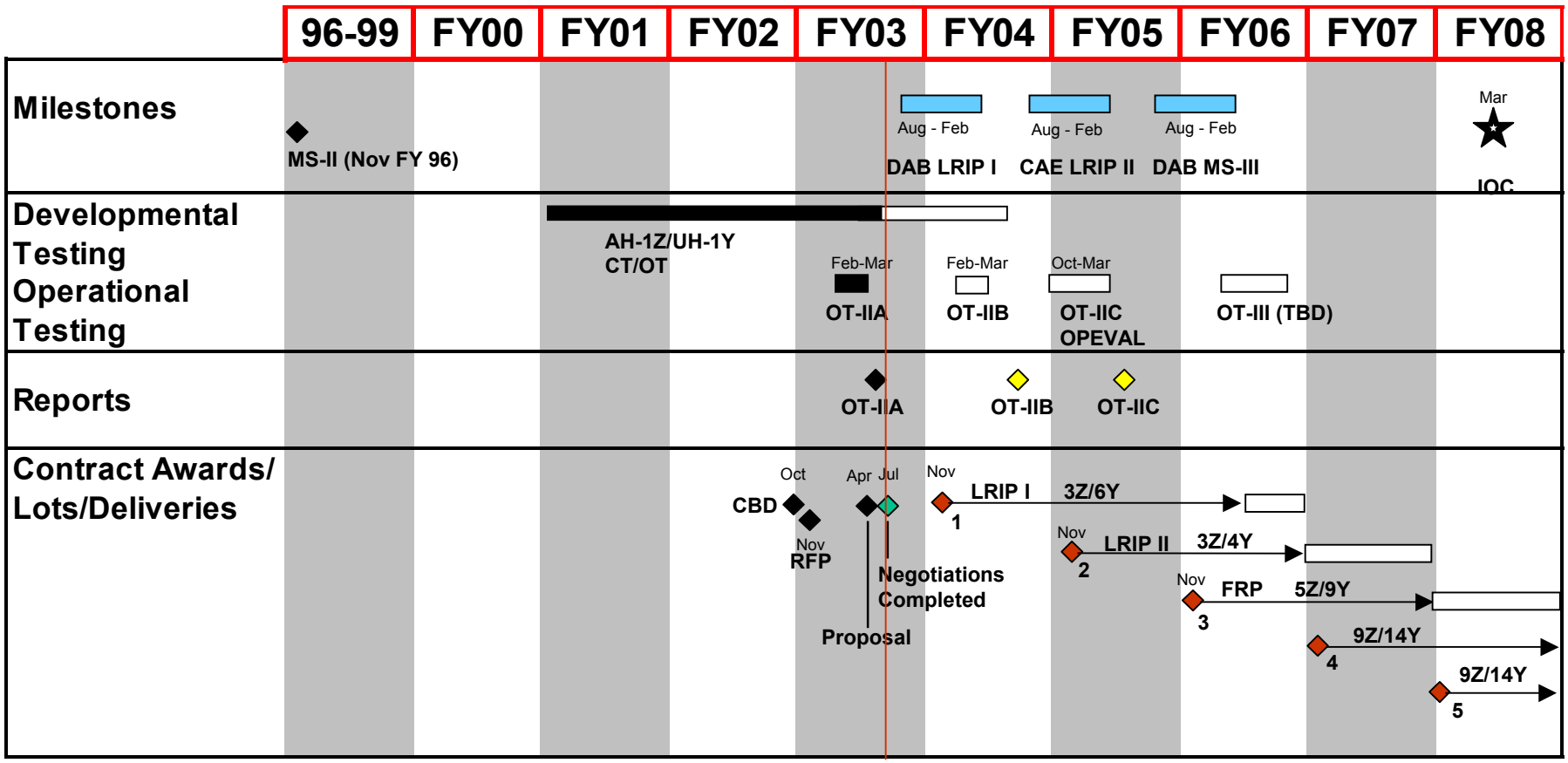
H-1 Upgrades

Improved Mission Capabilities

- Get to the battle (2+ range)
- Acquire and positively ID enemy with state-of-the-art sensors
- Accurate and lethal strike on enemy (AH-1Z: 16 Hellfire + AIM-9)
- Fight & survive (improved cockpit & survivability)
- Affordable & expeditionary (commonality with UH-1Y)
- Future growth capacity to enable Network Centric Warfare

USMC H-1 Upgrades Program of Record

Unless noted each event is for both UH-1Y and AH-1Z



Notes:
1. EMD Aircraft AH-1Z #2, #3 and UH-1Y#1, #2 are production representative and will be used for OT-IIC (OPEVAL)
2. Profile reflects FY 04 President's Budget submission

EMD Status
Flight Test

	AH-1Z	UH-1Y
Flight hours	Z1: 529.7 Z2: 108.0 Z3: 160.0	Y1: 300.3 Y2: 182.7
Max airspeed	222 kts	190 kts
Bank angle	116°	112°
Backward	45 kts	45 kts
Sideward	45 kts	45 kts
Cruise	160 kts	166 kts
Tested to	19,464 lbs.	19,568 lbs.
Software	• Build 2.4 in flight test	

- Z1 & Y1 completed high-altitude tests in Alamosa, CO
- Z1 Prod Elev Mod (3 Jun 2003) & Y1 in Mod C (7 Jun 2003)

H-1 Future Requirements

- Improved weapons
- Enhanced survivability
- Joint Interoperability enhancements
- Improved supportability
- All solutions need to be:
  - Smaller
  - Lighter
  - Affordable
  - Less power consumption
  - Compliant with environmental requirements

H-1 Helicopters are extremely weight/space limited

H-1 Upgrades Product Improvement Roadmap

(Huey Forward) Procurement		Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI	Lot VII	Lot VIII	Lot IX	Lot X	Lot XI		TOTAL
UH-1Y		6	4	9	14	14	14	14	14	11				100
AH-1Z		3	3	5	9	9	10	30	30	31	38	12		180

Delivery					Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI	Lot VII	Lot VIII	Lot IX	Lot X	Lot XI
UH-1Y					6	4	9	14	14	14	14	14	11		
AH-1Z					3	3	5	9	9	10	30	30	31	38	12

FY	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY10	FY 11	FY 12	FY 13	FY 14	FY 15	FY16

	Block 1 Lots I & II	Block 2 POM-06 Lots III & IV	Block 3 POM-08 Lots V & VI	Block 4 POM-10 Lots VII & VIII	Block 5 POM-12 Lot IX
Hardware	•Heavy Wx Tiedowns •Z Jack Point Beef-up •UH-1Y DAS Beam •Skyflex Sealant Tape •MGB Rotor Brake Mount Studs --- •Post Prod Line ECPs •20mm Linkless Feed •Brite Star •Safety Part I Corrections (if req'd)	•MC Upgrade -Dig Map -HMD •Link 16/JVMF •GPWS •TSS Enhancements -LST -IR Pointer -XR •5" Zuni •APKWS/Smart Pod •AIM-9X •Common Missile •Part I Corrections	•JTRS •GPS NAVWAR AJ Antenna, SASM.M-Code •CNS/ATM, R-Nav •CXP w/Modes S&5 •HMD Technology Refresh	•Z-401C Engine CILOP •MC Upgrade •ASE (EW) Upgrade •NCW Technology Refresh	•TSS Upgrade •NTIS Upgrade
Software	**OFP 4.0** •STR Corrections •Common Missile •JMPS	**OFP 5.0** •MC Upgrade -Dig Map -HMD •Link 16/JVMF •GPWS •TSS Enhancements -LST -IR Pointer -XR •5"Zuni •APKWS/Smart Pod •AIM-9X •Common Missile •STR Corrections •TSS Extended Range •TBD Enhancements	**OFP 6.0** •JTRS •GPS NAVWAR AJ Antenna,SASM.M-Code •CNS/ATM, R-Nav •CXP w/Modes S&5 •HMD Technology Refresh •STR Corrections •TBD Enhancements	**OFP 7.0** •MC Upgrade •ASE (EW) Upgrade •NCW Technology Refresh •STR Corrections •TBD Enhancements	**OFP 8.0** •TSS Upgrade •NTIS Upgrade •STR Corrections •TBD Enhancements

5/20/03

Improved Weapons

- Small, Light Weight, High Density Carriage PGMs
- Improved Weapon Accuracy/Stand-off
- Low-cost, precision guidance options
- Insensitive Munitions propulsion and warheads
- Thermobarics
- Lower cost missile technology
- M-197 gun system operational accuracy improvements
- M-197 reliability and maintainability improvements
- Responsive Targeting
  - Time Critical Strike, Automatic Target Recognition, Sensor to Weapon, BDA, etc.
  - Collaborative Targeting (different users and sources)
  - Advanced lossless imagery compression schemes
  - Sensor to sensor correlation for targeting (SAR to EO, IR to EO, etc.)
  - Web-centric precision imagery exploitation, geo-positioning, and targeting applications

Enhanced Survivability

- Improved lightweight, flexible body armor.
- Lightweight, ballistic tolerant material for seats
- Bullet proof glass for canopies
- Lightweight, forward-looking obstacle and wire strike detection system.
- Hands-off takeoff and landing system for helicopter zero-zero dusty LZ) operations.
- Economical, small, accurate low airspeed air data sensor
- Advanced ASE development
- Improved Radar, missile and laser warning
- Reliable, cost effective, lightweight IR suppressors and jammers for active IRCM suite.

Interoperability

- High-bandwidth over-the-horizon digital data link.
- Common joint digital connectivity to ensure future battlefield interoperability and effective use of PGMs
- Lightweight, miniaturized Link-16 capability
- Embedded electronic moving maps
- Smaller, lightweight, extended capacity digital flight/voice recorders
- Small Anti-jam GPS Antenna for beam-steering and nulling

Improved Supportability

- Predictive, obsolescence analysis tools
- Advanced Computing Architectures
- Dynamic Fault Tolerance
- Tools to Support Simulation-Based Acquisition
- Improved Software Portability Tools